

**Cordless Terminal Mobility (CTM);  
Phase 2;  
Service description**

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## Foreword

This European Standards (Telecommunications series) has been produced by ETSI Technical Committee Network Aspects (NA), and is now submitted for the Voting phase of the ETSI standards Two-step Approval Procedure.

In accordance with CCITT Recommendation I.130 [7], the first stage of the following three level structure is used to describe the telecommunications services as provided by European public telecommunications operators:

- Stage 1: is an overall service description, from the service subscriber's and user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

The present document details the stage 1 aspects (overall service description) for the CTM service, taking into account the various network architectures, e.g., IN.

The application of stage 2 and stage 3 may be different when the service is supported on an IN environment.

**NOTE:** CTM phase 2 service description improves phase 1 with enhancements in the area of mobility (handover, message waiting indication). Moreover it defines a comprehensive support for emergency call core feature. CTM phase 2 defines also CTM specific supplementary services. Regarding terminal capabilities the present document forms the basis for the DECT CTM Access Profile (CAP) ETS 300 824 [5].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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# 1 Scope

The present document defines the stage 1 service description for phase 2 of the CTM service. Stage 1 is an overall service description, primarily from the service subscriber's and user's point of view, but does not deal with the details of the human interface itself. The present document includes information applicable to network operators and terminal, switch and database manufacturers.

The present document specifies the requirements where the service is provided to the CTM user via a telecommunications network that is either the pan-European ISDN or a PSTN as provided by European public telecommunications operators.

The present document includes interworking requirements for cases where users in a call are located on different networks.

The provision of the CTM service on mobile networks is outside the scope of the present document.

The present document contains the core requirements for phase 2 of the CTM. A service may be provided on the basis of these core requirements alone.

The present document also documents some optional service features which may be used to enhance the service.

Furthermore, additional functionalities not documented in the present document may be implemented. The requirements of which are considered outside of the scope of the present document and consequently outside the scope of the corresponding stage 2 and stage 3 standards. Such additional functionality may be on a network-wide basis, or particular to one CTM user or a group of CTM users. Such additional functionality does not compromise conformance to the core requirements of the service.

Charging principles are outside the scope of the present document, unless specific service requirements are stated. These requirements deal with the allocation of certain call charges to particular CTM users.

Interactions with services and ISDN supplementary services not listed in clauses 8 and 9 are outside the scope of the present document.

The CTM service allows users of cordless terminals to be mobile within and between networks. Where radio coverage is provided and the cordless terminal has appropriate access rights the CTM user is able to make calls from, and to receive calls at, any location within the fixed public and/or private networks, and may move without interruption of a call in progress.

Phase 2 of the CTM service is applicable to the telephony 3,1 kHz teleservice (see ETS 300 111 [3]). Phase 2 of the CTM service is also applicable to the speech bearer service (see ETS 300 109 [1]) and the 3,1 kHz audio bearer service (see ETS 300 110 [2]).

If the present document is applicable to the stage 2 and stage 3 standards for the phase 2 of the CTM service, where the text indicates the status of a requirement (i.e. as strict command or prohibition, as authorization leaving freedom, as a capability or a possibility), this shall be reflected in the relevant stage 2 and stage 3 standards. Otherwise, the status of a requirement shall be reflected in the relevant standards for the underlying protocols. Furthermore, conformance to the present document is either met by:

- conforming to the stage 3 standards; or
- implicitly covered by conforming to the standards for the underlying protocols,

with the field of application appropriate to the equipment being implemented. Therefore no method of testing is provided for the present document.

## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETS 300 109 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer, Service description".
- [2] ETS 300 110 (1992): "Integrated Services Digital Network (ISDN); Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3,1 kHz audio information transfer, Service description".
- [3] ETS 300 111 (1992): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice, Service description".
- [4] ETS 300 345 (1994): "Integrated Services Digital Network (ISDN); Interworking between public ISDNs and private ISDNs for the provision of telecommunication services; General aspects".
- [5] ETS 300 824: "Digital Enhanced Cordless Telecommunications (DECT); Cordless Terminal Mobility (CTM); CTM Access Profile (CAP)".
- [6] ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".
- [7] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

## 3 Definitions

For the purpose of the present document, the following terms and definitions apply:

**authentication:** security mechanism allowing the verification of the provided identity

**access rights:** indication that the cordless terminal has appropriate access allowance to the CTM service

NOTE 1: This definition does not refer to any specific access technology.

**access rights identity:** identity which is globally unique to a service provider and which shows the access rights related to this service provider

**basic call (procedures):** procedures by which a call (as an instance of a basic telecommunication service) is established and terminated

NOTE 2: Emergency call is not a basic call.

**cordless terminal:** physical entity that provides access to the telecommunication services of a network via a radio interface

**core service feature:** particular service feature fundamental to the telecommunication service, i.e., in the absence of this service feature, the telecommunication service does not make sense as a commercial offering to the service subscriber

**coverage area:** area within the radio coverage area in which the CTM user has subscribed to use the CTM service

**CTM identity:** identity by which a CTM user is known to the CTM service providers and networks supporting CTM, and it is used for flexibility and security purposes. The CTM identity identifies a CTM user unambiguously. The CTM identity does not need to be known by users

**CTM number:** number that uniquely and unambiguously identifies each CTM user. It is used by a calling party to reach the CTM user. The number is independent of the calling terminal, network or service used and it is a E.164 number [6]

**E.164 number:** number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [6]

**forwarded-to number:** number to which the call is redirected as a result of call forwarding

**handover:** process by which a call in progress is maintained when the CTM user moves with the cordless terminal with a call in progress within a network where continuous radio coverage is provided

**location area:** radio coverage area in which a cordless terminal may receive calls as a result of a single location registration

**location registration:** process whereby the position of a CTM terminal is determined to the level of one location area

**network operator:** entity that provides the network operating elements and resources for the execution of the CTM service

**not reachable:** status in the network when an incoming call is offered to a cordless terminal but the cordless terminal is out of radio coverage, switched off or there is radio congestion

**optional service feature:** service feature added to core feature to optionally enhance a service offering

**radio coverage:** area in which cordless terminals may be used to establish and maintain telecommunication services via the radio base stations supported by the network supporting the CTM service

NOTE 3: The radio coverage supported by an individual network supporting the CTM service may be continuous or discontinuous, i.e. it may correspond to the complete geographical territory served by the network or it may not.

In the case of discontinuous radio coverage, the areas of radio coverage may consist of individual radio cells, serving for example isolated houses or very small businesses, or cordless islands consisting of a collection of radio cells providing continuous coverage of larger areas.

The radio coverage supported by a network supporting the CTM service may overlap with the radio coverage supported by one or more other networks supporting the CTM service or it may be complementary.

**roaming:** CTM user moves with the cordless terminal without a call in progress from one location area to another location area within the same and/or between different networks supporting the CTM service

**service feature:** specific aspect of a telecommunication service that can also be used in conjunction with other telecommunication services or service features as part of a commercial offering. It is either a core part of a telecommunication service or an optional part offered as an enhancement to a telecommunication service

**service profile:** record containing all the service information related to a CTM user

**service provider:** actor who provides CTM services to its service subscribers on a contractual basis and who is responsible for the CTM services offered. The same organization may act as a network operator and a service provider

**service subscriber:** entity that contracts for services offered by service providers

**service:** that which is offered by an administration or a public or private service provider to its service subscriber in order to satisfy a telecommunication requirement

**terminal mobility:** ability of a terminal to access telecommunication services, while in motion, and the capability of the network to locate and identify that terminal as it moves

**user:** person or machine delegated by a service subscriber to use the services and/or facilities of a telecommunication network



## 4 Abbreviations

For the purpose of the present document, the following abbreviations apply:

CAP	CTM Access Profile
CCBS	Completion of Calls to Busy Subscriber
CCNR	Completion of Calls on No Reply
CFB	Call Forwarding on Busy
CFNR	Call Forwarding on No Reply
CFNRc	Call Forwarding on Not Reachable
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CT2	Second generation of Cordless Technology
CTM	Cordless Terminal Mobility
CUG	Closed User Group
DECT	Digital Enhanced Cordless Telecommunications
ICS	Incoming Call Screening
IM	In-call Modification
IN	Intelligent Network
ISDN	Integrated Services Digital Network
OCB	Outgoing Call Barring
PISN	Private Integrated Services Network
PSTN	Public Switched Telephone Network
REV-S	REVerse charging at call Set up time
UPT	Universal Personal Telecommunication
UUS	User-to-User Signalling

## 5 Description

The CTM service allows users of cordless terminals to be mobile within and between networks. Where radio coverage is provided and the cordless terminal has appropriate access rights the CTM user shall be able to make calls from, and to receive calls at, any location within the fixed public and/or private networks, and may move without interruption of a call in progress.

The CTM service can be composed by "core service features" and "optional service features". The core service features provide a basic service, available to all CTM users.

The optional service features contain functionality that is additional to the core service features, that customise the service according to the needs of a specific service subscriber. These additional parts may be offered either to all the service provider's service subscribers, or to a group of service subscribers or even to a single service subscriber.

In addition to core service features, a network can implement optional service features. The availability to roaming CTM users of the optional features depends on the implementation of the optional features in other networks.

## 5.1 Core service features

The core service features are listed hereafter.

### 5.1.1 Numbering

The CTM number can be a non-geographical number or a geographical number according to the operator's choice.

It may therefore be possible for a user subscribing to the CTM service to keep the user's existing ITU-T Recommendation E.164 [6] number as a network option.

NOTE: When a user subscribes to the CTM service using the user's existing E.164 number as the CTM number, calls to the served user's ITU-T Recommendation E.164 [6] number may be routed either to the served user's cordless terminal or to the served user's fixed terminal according to the operator's choice.

### 5.1.2 Outgoing call

This service feature enables a CTM user to originate calls from the cordless terminal irrespective of its location in the coverage area.

The network may verify that the CTM user is permitted to place the call as requested.

### 5.1.3 Emergency call

This service feature enables a user to make an emergency call, i.e. a fast and easy means of giving information (at least the user's location) about an emergency situation to the appropriate emergency organization (e.g. fire service, police and ambulance). This feature can be accessed even without CTM subscription.

### 5.1.4 Incoming call

This service feature enables a CTM user to have incoming calls delivered to the cordless terminal irrespective of its location in the coverage area. The CTM user holds a CTM number that has to be used to reach the cordless terminal associated to this CTM number, wherever it is located, within the coverage area.

If the network is unable to complete an incoming call, the network shall send an appropriate notification to the calling user.

### 5.1.5 Roaming

This service feature enables a CTM user without a call in progress to move within the coverage area. Therefore, the network shall enable the roaming CTM user to register its current location. The deregistration of the CTM user's previous location shall also be performed. The extent to which roaming is permitted, may depend on the CTM user's subscription.

As an option, CTM user roaming can be provided to and from the CTM user's own residential area.

As a network operator/service provider option a CTM user can roam to and from another CTM user residential area with that user agreement.

NOTE 1: Roaming within and between networks supporting CTM requires that all networks maintain access rights information relating to each service provider with whom a roaming agreement exists.

NOTE 2: In the user's own residential area is a network operator/service provider option to provide alternative or additional (supplementary) services to CTM. These services are outside the scope of the present document.

### 5.1.6 Handover

This service feature enables a CTM user to move with the cordless terminal with a call in progress within a network where continuous radio coverage is provided and the cordless terminal has appropriate access rights.

Handover from one network to another is outside the scope of phase 2 of the CTM service.

NOTE: Within a network there may be limitations on handover between different switches. Such limitations could be operational or technical. Consequently, calls may be terminated in these cases.

### 5.1.7 Security

This service feature enables the CTM user (and the network) to be protected from different types of misuse due to the CTM service. Different type of security mechanisms may be used to protect from:

- fraudulent use;
- fraudulent access;
- eavesdropping;
- malicious behaviour.

Access network security mechanisms shall be provided by using terminal authentication, network authentication and encryption subject to the limitations of the appropriate cordless access standard.

Different service providers may offer different levels of security mechanisms to its subscribers.

#### 5.1.7.1 Terminal authentication

Terminal authentication is a security mechanism by which the network verifies that the identity provided by the terminal is the one claimed.

The purpose of this authentication security feature is to protect the network against unauthorized use. It enables also the protection of the service subscriber by denying the possibility for intruders to impersonate authorized CTM users.

The authentication of the terminal may be invoked by the network in various cases e.g. when the service subscriber requests for:

- access a service (including some or all of: originating or terminating CTM call, activation or deactivation of a feature/supplementary service); or
- a change of service subscriber related information (including some or all of: location handling, registration or erasure of a feature/supplementary service).

#### 5.1.7.2 Network authentication

Network authentication is a security mechanism by which a cordless terminal verifies that the identity provided by the network is the one claimed.

The purpose of this authentication security feature is to protect the cordless terminal from unauthorized access.

#### 5.1.7.3 Encryption

Encryption is a security mechanism by which the signalling and CTM user information is encrypted over the air interface.

The purpose of the encryption feature is to protect the signalling and CTM user information from eavesdropping.

### 5.1.8 Service profile

This service feature enables the CTM user to be provided with the CTM service according to subscription parameters as determined by the service provider. For that purpose, a service profile (e.g. containing the information needed for a correct call handling) shall be maintained for the CTM user.

### 5.1.9 Message waiting indication

This feature enables a CTM user to receive an indication of the status of a mailbox to which the CTM user has access.

## 5.2 Optional service features

Some possible optional service features are listed hereafter, but the service provider may offer other additional service features.

### 5.2.1 Service profile modification

This service feature enables the CTM user to modify some data in the CTM user's service profile. The CTM user may not have access to all the data in the user's service profile.

NOTE: The service profile modification may take place from another terminal than the served user's cordless terminal, e.g. by using DTMF signalling.

### 5.2.2 Service profile interrogation

This service feature enables the CTM user to perform interrogation of some data in the served user's service profile. The CTM user may not have access to all the data in the user's service profile.

NOTE: The service profile interrogation may take place from another terminal than the served user's cordless terminal, e.g. using DTMF signalling.

## 5.3 CTM supplementary services

This subclause describes the supplementary services applicable to phase 2 of the CTM service.

The supplementary services listed below have similar descriptions in the relevant standards for ISDN networks, but may have a different focus or additional functionality, which does not lead to incompatibility.

NOTE: Short graphical or alphanumeric indications displayed on the CTM user's terminal screen could be associated with supplementary services.

### 5.3.1 CTM call forwarding on not reachable

This supplementary service provides the CTM user with the ability to have incoming calls redirected to another number when he/she is not reachable. The CTM-CFNRc supplementary service operates on all calls. The served user's ability to originate calls is in principle unaffected by the CTM-CFNRc supplementary service.

NOTE: Practically the served user's ability to originate calls is affected if there is radio congestion or if the served user's cordless terminal for example is being out of radio coverage.

After the CTM-CFNRc supplementary service has been activated, calls are forwarded only if the served user's cordless terminal is not reachable.

### 5.3.2 CTM call forwarding unconditional

This supplementary service provides the CTM user with the ability to have incoming calls redirected to another number unconditionally.

### 5.3.3 CTM call forwarding on busy

This supplementary service provides the CTM user with the ability to have incoming calls redirected to another number when he/she is busy with another call.

### 5.3.4 CTM call forwarding on no reply

This supplementary service provides the CTM user with the ability to have incoming calls redirected to another number when there is no answer on the user's terminal.

### 5.3.5 CTM calling line identification presentation

CTM CLIP is a supplementary service offered to the called party which provides the calling party's number to the called party.

### 5.3.6 CTM calling line identification restriction

CTM CLIR is a supplementary service offered to the calling party to restrict presentation of the calling party's number to the called party.

### 5.3.7 CTM connected line identification presentation

CTM COLP is a supplementary service offered to the calling party which provides the connected party's number to the calling party.

### 5.3.8 CTM connected line identification restriction

CTM COLR is a supplementary service offered to the called party to restrict presentation of the called party's number to the calling party.

### 5.3.9 CTM incoming call screening

This supplementary service provides the CTM user with the ability to restrict incoming calls. The screening criteria are recorded in the CTM service profile.

### 5.3.10 CTM outgoing call barring

This supplementary service provides the CTM user with the ability to restrict outgoing calls. The barring criteria are recorded in the CTM service profile.

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## 6 Procedures

From the CTM user's perspective, the procedures of ETS 300 111 [3], ETS 300 109 [1] and ETS 300 110 [2], as appropriate for the required basic service, shall apply for the calls using the CTM service. This clause contains the additional procedures for the support of cordless terminals. The procedures specified in this clause are applicable for the served user's cordless terminal.

### 6.1 Provision and withdrawal

The CTM service shall be provided after prior arrangement with the service provider. The service subscriber and the service provider have a contractual relationship and agree upon the service details, e.g. the coverage area could be a part of the contract. The service provider and the involved network operators make arrangements for service provision by the network(s).

The CTM service to the CTM user shall be provided by prior arrangement between the service provider and the network operator(s). A service profile shall be created for the CTM user.

The CTM service shall be withdrawn from a specific user upon request of the service subscriber or for service provider reasons.

Users are able to make emergency call without having CTM subscription.

## 6.2 Normal procedures

### 6.2.1 Registration, deregistration and erasure

#### 6.2.1.1 Core requirements

Before the CTM user receives access rights to the service, its cordless terminal has to be made known to the network and certain identities and other specific information shall be exchanged between network and terminal by means of on-air procedures. This process of obtaining access rights is called service registration. This procedure is used by the cordless terminal to gain access to the network to enable calls to be made and received.

Access rights for a cordless terminal shall be terminated by following a service de-registration procedure.

Service registration and de-registration are administrative procedures controlled by the service provider.

The network shall support procedures for service registration and de-registration. If service registration or de-registration is performed then this shall be valid throughout the area of service provision, i.e. a roaming CTM user shall not be required to perform new service registrations while roaming between networks.

Service registration related data (i.e. identities and other specific information exchanged between network and terminal) could be changed after service registration by means of on air procedures. This procedure is initiated by the network operator.

Users are able to make emergency call without having CTM service registration.

#### 6.2.1.2 Optional requirements

Access rights can be terminated by means of on-air procedures.

The CTM user can register and erase data in the user's service profile by means of procedures. As a network option it could be possible to give the CTM user knowledge of some or all the data in the user's service profile. It is a service provider option to define the limit of restriction for the registration and erasure procedures.

The network shall respond with the requested information to the CTM user if access is allowed.

### 6.2.2 Activation and deactivation

#### 6.2.2.1 Core requirements

The CTM service to a user shall be activated when that user makes its location known to the network (location registration). This may occur for new subscriptions. Location registration shall cause the network to register the user at the current location area.

Users are able to make emergency call without making location registration.

#### 6.2.2.2 Optional requirements

Not applicable.

## 6.2.3 Invocation and operation

### 6.2.3.1 Core requirements

#### **Roaming**

For each CTM user, information shall be maintained relating to the location of the CTM user within the network.

Location registration shall be invoked to register a CTM user's current location area when the location area has changed, or at intervals of time specified by the network.

Location registration shall cause the network to register the CTM user at the current location area. The location information at the previously visited location shall be deleted. When the procedures are completed, the location registration shall be confirmed to the CTM user.

NOTE 1: As a result of a location registration the network may assign a temporary identity to the CTM user.

Location deregistration is invoked by the user (e.g. detach) in order to inform the network that he/she is no longer able to receive calls.

#### **Authentication**

At any time a CTM user is registered in the network, authentication may be invoked. Authentication may be invoked by both the CTM user and the network. Upon invocation by the network, the network sends specific information (challenge) to the CTM user and awaits a response. The response from the CTM user to the network may either indicate success or failure or contain sufficient information to the network to determine the result. If the result is not the expected response, the network may take any action as appropriate. Upon invocation of authentication by the CTM user, the CTM user sends specific information (challenge) to the network and awaits a response. The response from the network to the CTM user may either indicate a success or a failure or contain sufficient information to the CTM user to determine the result. If the result is not the expected response, the CTM user may take any action as appropriate.

The scope of network authentication is limited to security aspects related to service registration/de-registration.

#### **Encryption**

In order to protect the signalling and CTM user information from eavesdropping encryption on the air interface shall be invoked.

#### **Outgoing call**

If the CTM user originates a call, the network shall verify that the CTM user is registered in the network, and if so, set the originating number to the complete CTM number, if applicable. The network shall then make the CTM user's service profile available in order to check the relevant CTM subscribed feature, with further call establishment following normal basic call procedures.

When a user originates a call the network shall be capable of discriminating an emergency service access request from non-emergency service requests in order to ensure that it is possible to bypass the normal call validation and establishment mechanisms. The network accepting the call shall not apply authentication procedures. Where applicable, emergency calls shall take priority over other calls waiting.

In case of emergency call, the CTM user's currently registered location and CTM number if known, is presented to the emergency call centre.

NOTE 2: The issue of providing the identity of the terminal to the emergency call centre will be managed by the NA6 Security Task Force.

#### **Incoming call**

When analysis of a destination number for an incoming call indicates that the called user is the CTM user, the network shall route the call to the CTM user using the CTM user's currently registered location.

### **Message waiting indication**

The network shall be capable to provide the message waiting indication to the CTM user (e.g. number and type of messages contained in the CTM user's mailbox).

#### **6.2.3.2 Optional requirements**

### **Service Profile modification**

The CTM user may be given the possibility to modify some of the data in the served user's service profile using DTMF signalling procedures. The CTM user may not have access to all of the data in the user's service profile.

The definition of these DTMF signalling procedures are outside the scope of the present document.

#### **6.2.4 Interrogation**

##### **6.2.4.1 Core requirements**

Not applicable.

##### **6.2.4.2 Optional requirements**

The served user can interrogate data in the user's service profile by means of procedures. The CTM user should have access to the data in the user's service profile. However, as a service provider option some data can be restricted for the interrogation procedure.

The network shall respond with the requested information to the CTM user if access is allowed.

### **6.3 Exceptional procedures**

#### **6.3.1 Registration and erasure**

##### **6.3.1.1 Core requirements**

Service registration shall be rejected under at least the following circumstances:

- authentication fails;
- terminal identity unknown.

##### **6.3.1.2 Optional requirements**

Termination of access rights shall be rejected if the network authentication fails.

If the CTM user requests to register or erase inaccessible service profile data then the network shall reject such a request.

#### **6.3.2 Activation and deactivation**

##### **6.3.2.1 Core requirements**

Location registration shall be rejected under at least the following circumstances:

- user identity not known;
- user not permitted to register in the current location area;
- location registration temporarily not possible.



### 6.3.2.2 Optional requirements

Not applicable.

## 6.3.3 Invocation and operation

### 6.3.3.1 Core requirements

#### **Roaming**

Location registration shall be rejected under at least the following circumstances:

- user identity not known;
- user not permitted to register in the current location area;
- location registration temporarily not possible.

#### **Authentication**

If authentication fails for one of the following reasons, the network may withdraw or limit the service to the CTM user. Possible reasons for failure are:

- incorrect authentication parameters;
- cordless terminal not accessible.

#### **Encryption**

If the encryption fails then the connection may proceed without protection from eavesdropping.

#### **Outgoing call**

The network may reject outgoing call requests from a user with an appropriate failure indication for any of the following reasons:

- no originating number provided;
- the indicated user is not registered at the network;
- the CTM user's service profile does not allow the requested call.

#### **Incoming call**

If the network is unable to complete an incoming call to a CTM user, an indication that the call was unsuccessful shall be sent to the calling user. Normal basic call failure procedures shall be used.

#### **Message waiting indication**

If message waiting indication fails due to the unreachability of the CTM user, the network shall attempt to send the message waiting indication as soon as the CTM user becomes reachable again.

NOTE: For the terminal capability supporting this procedure see DECT CTM Access Profile (CAP) ETS 300 824 [5].

### 6.3.3.2 Optional requirements

Not applicable.

### 6.3.4 Interrogation

#### 6.3.4.1 Core requirements

Not applicable.

#### 6.3.4.2 Optional requirements

If the CTM user requests to interrogate inaccessible service profile data then the network shall reject such a request.

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## 7 Interworking requirements

### 7.1 Interworking between public networks providing the CTM service

CTM shall be supported in a co-operative manner across the inter-network interface between different public networks.

NOTE: A public network can be comprised of ISDN and PSTN.

Interworking in terms of roaming between different public networks is included in CTM phase 2. In cases where a CTM user is at a location which is within the coverage area of more than one network, e.g. two public networks, the CTM user can choose the network with which the CTM user's location is registered. This can be performed automatically by the terminal or by user procedures.

#### 7.1.1 Public CTM user roams into a visited public network

The procedures at the boundary between the different public networks shall enable a CTM user, with a subscription in the home public network, to roam into, and out of, a visited public network whilst retaining the service related to its home public network subscription.

The visited public network shall co-operate with the home public network to offer the CTM user the same procedures (for location handling, authentication and call handling) as specified in clause 6, i.e. as if the CTM user was attached to the home public network.

NOTE 1: This assumes that the visited public network has implemented similar procedures, as specified for the home public networks. In cases where some procedures have not been implemented in the visited public network, then there may be limitations on the operation of some aspects of the CTM service.

NOTE 2: The visited network may provide alternative and additional supplementary services which can be provided by the visited network for the roaming user, depending on an appropriate co-operation agreement. The provision of these services is out of the scope of the present document.

### 7.2 Interworking with private networks

CTM shall be supported in a co-operative manner across the inter-network interface between public and private networks.

If CTM is provided by an ISDN, then interworking with private ISDNs shall include the requirements given in ETS 300 345 [4].

Interworking in terms of roaming between public and private ISDNs is included in CTM phase 2. In cases where a CTM user is at a location which is within the coverage area of more than one network (e.g. a public and a private network), the CTM user can choose the network with which the CTM user's location is registered. This can be performed automatically by the terminal or by user procedures.

### 7.2.1 Public CTM user roams into a PISN area

The procedures at the boundary between public and private network shall enable a CTM user, with a subscription in the public network, to roam into, and out of, a PISN area whilst retaining the service related to its public network subscription.

The public network shall co-operate with the PISN to offer the CTM user the same procedures (for location handling, authentication and call handling) as specified in clause 6, i.e. as if the CTM user was attached to the public ISDN.

NOTE 1: This assumes that the PISN has implemented similar procedures to those specified for public networks. In cases where some procedures have not been implemented in the private network, then there may be limitations on the operation of some aspects of the CTM service.

NOTE 2: The visited network may provide alternative and additional supplementary services which can be provided by the visited network for the roaming user, depending on an appropriate co-operation agreement. The provision of these services is out of the scope of the present document.

### 7.2.2 Private CTM user roams into a public CTM network area

The procedures at the boundary between public and private network shall enable a CTM user, with a subscription in the private network, to roam into, and out of, a public CTM network area whilst retaining the service related to its private network subscription.

The public network shall co-operate with the PISN in offering the CTM user the same procedures (for location handling, authentication and call handling) as specified for private networks, i.e. as if the CTM user was attached to the PISN.

NOTE 1: This assumes that the public network has implemented similar procedures to those specified for private networks. In cases where some procedures have not been implemented in the public network, then there may be limitations on the operation of some aspects of the CTM service.

NOTE 2: The visited network may provide alternative and additional supplementary services which can be provided by the visited network for the roaming user, depending on an appropriate co-operation agreement. The provision of these services is out of the scope of the present document.

## 7.3 Interworking with networks not providing the CTM service

Interworking in terms of roaming between a public network supporting the CTM service and a network not supporting the CTM service (e.g. a mobile network) is outside the scope of the present document. Calls between those networks shall be supported.

## 7.4 Co-operation between network operators and service providers

Interworking between different service providers in CTM phase 2 is to be handled as covered in 7.1, 7.2 and 7.3. A prerequisite for support of public CTM users in a private network is that a roaming agreement has been established between the involved public and private network operators and/or service providers. The roaming agreement can either be in only one direction, e.g. from public to private networks or from private to public networks, or in both directions.

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## 8 Interaction with ISDN supplementary services

Interactions between the CTM service and ISDN supplementary services have not been considered, unless specific indication is given.

The specified interactions are according to the following principles:

- the ISDN supplementary services are subscribed to on an ISDN access;
- the CTM user does not have any ISDN supplementary services;

- the CTM user is able to subscribe to CTM supplementary services;
- "CTM calling user" means that the call in question originates from the CTM user and terminates at the ISDN user;
- "CTM called user" means that the call in question originates from an ISDN user and terminates at the CTM user.

## 8.1 Interaction description

### 8.1.1 Advice of charge services (AOC-S, AOC-D, AOC-E, AOC-R)

#### **CTM called user:**

No impact, i.e. neither service shall affect the operation of the other service.

### 8.1.2 Call hold (HOLD)

No impact, i.e. neither service shall affect the operation of the other service.

### 8.1.3 Explicit call transfer

No impact, i.e. neither service shall affect the operation of the other service.

### 8.1.4 Calling line identification presentation

#### **CTM calling user:**

The called user shall not receive information pertaining to the CTM user's registered location but the CTM number of the calling user. If the calling CTM user has invoked the CTM CLIR supplementary service, the calling user's CTM number shall not be presented to the called user unless the called user has an override capability.

#### **CTM called user:**

Presentation of the calling party's number to the called CTM user is done by means of the CTM CLIP supplementary service.

### 8.1.5 Calling line identification restriction

#### **CTM calling user:**

Restriction of the presentation of the calling party's number of a CTM user is done by means of the CTM CLIR supplementary service.

#### **CTM called user:**

If the CLIR supplementary service has been invoked, the calling user's number shall not be presented to the called CTM user unless the called CTM user has an override capability.

### 8.1.6 Connected line identification presentation

#### **CTM calling user:**

Presentation of the connected party's number to the calling CTM user is done by means of the CTM COLP supplementary service.

#### **CTM called user:**

The calling user shall not receive information pertaining to the CTM user's registered location but the CTM number of the called user. If the called CTM user has invoked the CTM COLR, the called user's CTM number shall not be presented to the calling user unless the calling user has an override capability.

### 8.1.7 Connected line identification restriction

**CTM calling user:**

If the COLR supplementary service has been invoked by the called user, the called user's number shall not be presented to the calling CTM user unless the calling CTM user has an override capability.

**CTM called user:**

Restriction of the presentation of the connected party's number of a CTM user is done by means of the CTM COLR supplementary service.

### 8.1.8 Closed user group

No impact, i.e. neither service shall affect the operation of the other service.

NOTE: Restrictions applied by the CUG supplementary service may block CTM calls.

### 8.1.9 Completion of calls to busy subscriber

**CTM called user:**

A request for the call CCBS supplementary service on a call to a CTM number shall be rejected.

### 8.1.10 Completion of calls on no reply

**CTM called user:**

A request for the call CCNR supplementary service on a call to a CTM number shall be rejected.

### 8.1.11 Conference call, add-on (CONF)

No impact, i.e. neither service shall affect the operation of the other service.

### 8.1.12 Call forwarding unconditional

**CTM calling user:**

No impact, i.e. neither service shall affect the operation of the other service.

**CTM called user:**

A call to a CTM number may be forwarded by means of the CTM CFU supplementary service.

### 8.1.13 Call forwarding on busy

**CTM calling user:**

No impact, i.e. neither service shall affect the operation of the other service.

**CTM called user:**

A call to a CTM number may be forwarded by means of the CTM CFB supplementary service.

### 8.1.14 Call forwarding on not reachable

**CTM calling user:**

No impact, i.e. neither service shall affect the operation of the other service.

**CTM called user:**

A call to a CTM number may be forwarded by means of the CTM CFNR supplementary service.

**8.1.15 Selective call forwarding****CTM calling user:**

No impact, i.e. neither service shall affect the operation of the other service.

**8.1.16 Call forwarding unconditional to a service centre****CTM calling user:**

No impact, i.e. neither service shall affect the operation of the other service.

**8.1.17 Malicious call identification**

Both the CTM number and the number of the CTM user's currently registered location shall be registered.

**8.1.18 Three party**

No impact, i.e. neither service shall affect the operation of the other service.

**8.1.19 User-to-user signalling**

Activation of the UUS supplementary service is not possible on calls to/from a CTM number.

**8.1.20 In-call modification**

Activation of the IM supplementary service is not possible on calls to/from a CTM number.

**8.1.21 Trunk hunting**

Not applicable.

**8.1.22 Fixed outgoing call barring****CTM calling user:**

Restriction of outgoing calls is done by means of the CTM OCB supplementary service.

**CTM called user:**

No impact, i.e. neither service shall affect the operation of the other service.

**8.1.23 User controlled outgoing call barring****CTM calling user:**

Restriction of outgoing calls is done by means of the CTM OCB supplementary service.

**CTM called user:**

No impact, i.e. neither service shall affect the operation of the other service.

### 8.1.24 Reverse charging at call set up time

A request for REV-S on a CTM call shall be rejected with an appropriate reason.

### 8.1.25 Message waiting indication

Not applicable.

### 8.1.26 Other supplementary services, other services

No interactions have been identified for the ISDN supplementary services and the other services listed hereafter.

- Meet-me conference;
- Direct dialling in;
- Freephone;
- Multiple subscriber number;
- Subaddressing;
- Terminal portability;
- Line hunting;
- Support of private numbering plan;
- Remote control of supplementary services;
- Universal access number;
- Charge card calling;
- Virtual card calling;
- Premium rate;
- Televoting;
- Universal Personal Telecommunication.

The interaction description for these services is below:

No impact, i.e. neither service shall affect the operation of the other service.

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## 9 Interaction with other services

### 9.1 Universal personal telecommunication

No impact, i.e. neither service shall affect the operation of the other service.

NOTE: The CTM service and the UPT service are independent of each other.

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# History

Document history				
V1.1.1	July 1998	Public Enquiry	PE 9845:	1998-06-17 to 1998-11-13
V1.1.2	October 1999	Vote	V 9954:	1999-10-26 to 1999-12-24